the totalizer, make sure to note the value of the last (farthest right) digit. Often this digit indicates hundreds of gallons, in which case the totalizer number needs to be multiplied by 100.

Note: Step 2b should be used rather than 2a if the instantaneous flow rate varies by more than 10 percent after all the air has been purged from the system and the flow has stabilized. For flow meters with needles (normally propeller-type), this is indicated by a "bouncing" needle.

Determining Effective Width, W_e (See Figures 4a, 4b, and 4c):

(You will need flags and a tape measure or measuring wheel.)

Low-profile–type units

For "low-profile"-type units (Figure 1 and Figure 4a) operated with little to no overlap (edge-to-edge), simply record the advertised width. This width is roughly the width of the unit.

Boom-type units

It is not as easy to determine the effective width for boom-type units (Figures 2, 4b, and 4c). To achieve consistent application uniformity between adjacent passes, the distance between the nozzles in adjacent passes should be the same as the fixed distance between the nozzles on the boom. This requires a tractor pass spacing equal to the number of nozzles on the boom times the distance between the nozzles ("N" in Figure 4b) . For the case with two nozzles the effective width should be 2 x N . If the field measured effective width calculated in the following steps differs by more than 15 percent of this target value, adjust the pass distance.

For boom-type units, the wetted widths measured in step 2 will depend upon nozzle pressure, boom height, and angle of the splash plates. If boom height and splash plate angle are adjustable, make note of these settings as an adjustment will alter the wetted width and, therefore, the calibration. Boom-type units may also be subject to drift, so calibration of these units should be done in wind speeds of 5 mph or less.

1. Measure the distance between the fixed nozzles. Multiply this distance by the number of nozzles on the boom to obtain the target effective width.
2. For boom-type units (see Figure 2 and Figure 4b) that spread wastewater an appreciable distance from the nozzle:

a. Measure the wetted width of a single pass (W_m)
b. Measure the wetted width of two adjacent passes (W_{2m})

Repeat steps 2a. and 2b. twice for a total of three measurements each. Take these measurements at least 25 feet from each other, and average both wetted width measurements.

The effective width (W_e) is:

Equation 4:

$$W_e = W_{2m} - W_m$$

The tractor speed, flow rate, and effective width measurements are used to calculate application depth in the field data sheet or with Equation 1. Data from the field data sheet may be used with Equation 2 to determine the target tractor speed to achieve a desired application depth.

Interpretation and Adjustments

Compare the calculated application depth against the depth allowed in the animal waste utilization plan, and against any problems observed in the field. If either the application depth measured in the field is greater than the limit in the waste utilization plan, or runoff occurs on the field, the application rate is too high. To reduce the application rate, increase the tractor speed. The target tractor speed may be calculated from Equation 2 using the system flow rate and effective width determined in the field procedure.

If the application rate is less than desired (and under the permitted limit), reduce tractor speed to increase the application rate. After adjusting the tractor speed, verify the new speed using the procedure previously described. In no case should the application rate allow ponding or runoff, regardless of the permitted limit.